

REMARKS**Summary of the Office Action**

In the Office Action, claims 1-3, 5-8 and 12-14 stand rejected under 35 U.S.C. § 103 (a), as being unpatentable over U.S. Patent No. 4,976,582 to *Clavel* in view of U.S. Patent No. 4,695,181 to *Rahmede*.

Summary of the Response to the Office Action

Applicant proposes canceling claim 6 and amending claims 1 and 12. Accordingly, claims 1-3, 5, 7, 8 and 12-14 are pending for further consideration.

All Claims are Allowable

Claims 1-3, 5-8 and 12-14 stand rejected under 35 U.S.C. § 103 (a), as being unpatentable over U.S. Patent No. 4,976,582 to *Clavel* in view of U.S. Patent No. 4,695,181 to *Rahmede*. Applicant traverses this rejection for the following reasons.

With regard to independent claim 1, Applicant respectfully asserts that *Clavel* and *Rahmede*, viewed either singly or in combination, fail to teach or suggest an industrial robot including, “a bearing element ... [including] friction-increasing means in the form of grooves arranged substantially parallel with a central axis of the bearing element, the housing including a surface against which the bearing element abuts and the surface being provided with friction-increasing means in the form of complementary grooves engageable with the grooves provided on the bearing element to increase friction between the surface and the bearing element,” as recited in independent claim 1, as amended.

Support for these limitations recited in claim 1 can be found at least on pages 3 and 4 of the originally filed specification, and in Figs. 1-3 and 5 of the originally filed drawings. Specifically, as shown in Fig. 5, the present invention discloses an industrial robot including at least one linkage device in which pull rods are arranged in a multi-joint system where the joints

include three-axle ball and socket joints, such as the ones disclosed in Figs. 1-3. The ball and socket joints include a bearing element 3, which is fixed so as not to rotate in housing 2 of the socket joint. In order to increase the contact friction between surface 4 of housing 2 and bearing element 3, bearing element 3 may be provided with friction-increasing means in the form of grooves 5' arranged substantially parallel with the central axis (A) of the bearing element (see Figs. 3 and 4, page 3, lines 29-30 and page 4, lines 4-8). These grooves on bearing element 3 may abut against surface 4 of housing 2, which also includes friction-increasing means in the form of complementary grooves engageable with the grooves provided on bearing element 3 to increase friction between surface 4 and bearing element 3 (see page 4, lines 4-8).

The Office Action cites *Clavel* and *Rahmede* as teaching or suggesting the invention recited in claims 1-8 and 12-14.

Specifically, *Clavel* discloses a standard robot including ball and socket type joints. As acknowledged in the Office Action, *Clavel* does not disclose the ball and socket joints including a bearing and friction-increasing means.

Rahmede, as illustrated in Figs. 5 and 8, discloses a ball joint including an inner bearing 21 which abuts against inner bottom 19 of joint housing 1. Inner bottom 19 includes curved elevations 20 such that inner bearing 21 is deformed into recesses 22 defined between elevations 20. As illustrated in Fig. 8 of *Rahmede*, elevations 20 clearly converge towards the bottom center of joint housing 1. Therefore, with inner bearing 21 inserted into housing 21 and thereby deformed by curved elevations 21, the deformation thereof prevents rotation of inner bearing 21 relative to joint housing 1.

Contrary to the teachings of *Rahmede*, the present invention clearly recites an industrial robot including, "a bearing element ... [including] friction-increasing means ... and ... the housing including a surface against which the bearing element abuts and the surface being provided with friction-increasing means in the form of complementary grooves," as recited in independent claim 1, as amended. In other words, contrary to the recitation in independent claim

1, *Rahmede* clearly does not teach or suggest providing friction-increasing means, i.e. grooves, on both the bearing and the surface engaged with the bearing.

Moreover, contrary to the teachings of *Rahmede*, the present invention clearly recites an industrial robot including, “a bearing element ... [including] friction-increasing means in the form of grooves arranged substantially parallel with a central axis of the bearing element, the housing including a surface against which the bearing element abuts and the surface being provided with friction-increasing means in the form of complementary grooves engageable with the grooves provided on the bearing element to increase friction between the surface and the bearing element,” as recited in independent claim 1, as amended. In other words, contrary to the recitation in independent claim 1, *Rahmede* further clearly does not teach or suggest the bearing element and the surface engaged with the bearing element including grooves disposed substantially parallel to the central axis of the bearing element. Instead, as discussed above and as illustrated in Fig. 8 of *Rahmede*, elevations 20 of *Rahmede* clearly converge towards the bottom center of joint housing 1, and clearly do not extend parallel to the central axis of the housing.

Applicant respectfully asserts that as discussed on page 2, lines 25-26 of the original specification, a primary goal of the present invention is to provide a means for firmly attaching the bearing means, as well as facilitating replaceability thereof. This primary goal is achieved by the provision of parallel grooves discussed above and recited in independent claim 1 (original claim 6), which enables firm attachment of the bearing means to the joint socket, and further facilitates efficient replaceability of the bearing means due to the parallel oriented grooves.

Applicant respectfully asserts that based at least upon the aforementioned distinctions, *Clavel* and *Rahmede* clearly do not teach or suggest an industrial robot including, “a bearing element ... [including] friction-increasing means in the form of grooves arranged substantially parallel with a central axis of the bearing element, the housing including a surface against which the bearing element abuts and the surface being provided with friction-increasing means in the

form of complementary grooves engageable with the grooves provided on the bearing element to increase friction between the surface and the bearing element,” as recited in independent claim 1, as amended.

As pointed out in MPEP § 2131, “[t]o anticipate a claim, the reference must teach every element of the claim.” “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. Of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Additionally, as pointed out in M.P.E.P. § 2143.03, “[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art”. *In re Royka*, 409 F.2d 981, 180 USPQ 580 (CCPA 1974). Since these criteria have not been met, Applicant respectfully asserts that the rejection under 35 U.S.C. § 103 (a) should be withdrawn because *Clavel* and *Rahmede* do not teach or suggest each feature of independent claim 1.

In view of the above arguments, Applicant respectfully requests the rejection of independent claim 1 under 35 U.S.C. § 103 be withdrawn. Moreover, claims 2, 3, 5, 7 and 8, which depend from independent claim 1, are allowable at least because their base claim is allowable, as well as for the additional features recited therein.

Independent claim 12

With regard to independent claim 12, Applicant respectfully asserts that *Clavel* and *Rahmede* do not teach or suggest a method for eliminating risk of play in a three-axle ball and socket joint in an industrial robot, “comprising the steps of ... providing at least one linkage device for the robot, the device having pull rods arranged in a multi-joint system where the joints each comprise the three-axle ball and socket joint, providing a socket of the joint with a housing to accommodate a bearing element, providing the bearing element with friction-increasing means in the form of grooves arranged substantially parallel with a central axis of the bearing element, providing the housing with a surface against which the bearing element abuts, fixing the bearing

element such that the bearing element does not rotate in the housing, the fixing step being effected by providing the surface with friction-increasing means in the form of complementary grooves engageable with the grooves provided on the bearing element, and engaging the friction-increasing means with the bearing element when the bearing element is positioned in place,” as recited in claim 12, as amended.

Applicant respectfully asserts that claim 12 is allowable at least for the reasons presented above for the allowance of claim 1, and the additional features recited therein. In the interest of avoiding redundant arguments, reasons for the allowance of claim 12 are not repeated herein.

In view of the above arguments, Applicant respectfully requests the rejection of independent claim 12 under 35 U.S.C. § 103 be withdrawn. Moreover, claims 13 and 14, which depend from independent claim 12, are allowable at least because their base claim is allowable, as well as for the additional features recited therein.

Response to Final Office Action

With regard to the amendments to claims 1 and 12 proposed herein, Applicant respectfully brings to the Examiner’s attention that claims 1 and 12 have been amended to include the subject matter of original dependent claim 6, which has been cancelled herein.

CONCLUSION

In view of the foregoing, Applicant respectfully requests the entry of this Amendment to place the application in clear condition for allowance or, in the alternative, in better form for appeal. Applicant also requests the Examiner’s reconsideration and reexamination of the application and the timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicant’s undersigned representative to expedite prosecution.

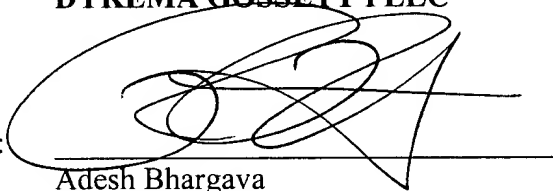
If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 04-2223. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

DYKEMA GOSSETT PLLC

Dated: March 12, 2004

By:

A handwritten signature in black ink, appearing to be 'Adesh Bhargava', written over a horizontal line.

Adesh Bhargava

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